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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
CINCINNATI, OHIO 45268

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DATE: December 27, 1979

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SUBJECT: Leachability and Revegetation of Mineral Mining Wastes in the Joplin Area

FROM: M. Lynn Apel, Physical Scientist *M. Lynn Apel*
Extraction Technology Branch, REHD, IERL-Ci

TO: Dale B. Parke
Head, Water Quality Standards, Region VII

I would like to take this opportunity to thank you for the courtesies you extended to Jack Hubbard, Jim Acton, and myself during our visit to Joplin on December 10 and 11. The information you provided us was exceptionally helpful.

We greatly appreciate your help regarding the analysis and identification of the vegetation samples. At this time, it appears the switch grass has the greatest potential for use in our revegetation study. I will be contacting Ken Blane to obtain more information, as you suggested.

At the conclusion of our testing program, we will send you a draft copy of the report for your review and comment.

Thanks again for your help and if we can be of any further assistance, please don't hesitate to contact us.

RECEIVED

DEC 31 1979

WATER QUALITY PLANNING
WATER DIVISION

40114621



SUPERFUND RECORDS

LEACHABILITY AND REVEGETATION OF SOLID WASTE FROM MINING

Objectives:

The objectives of this project are to determine the quality and quantity of leachate generated by the disposal of mining waste under various layering configurations, and to assess the vegetative uptake of potentially hazardous materials from the solid waste.

Fundamental Considerations:

The Extraction Technology Branch is currently participating in a study for the Office of Solid Waste to determine the environmental impact of solid waste from the phosphate, uranium, and metallic ore mining industries. As part of this study, the impact of these solid wastes on groundwater and surface water will be investigated. The leachability of potentially hazardous materials is of specific concern. To provide more detailed information, and to support field observations concerning the movement of salts in the wastes, pilot plant column studies will be conducted at the T&E Facility. Samples of wastes that are being studied in the field will be shipped to the laboratory for physical and chemical characterization prior to being placed in columns. Management practices similar to those used in the field will be applied to the columns. Since revegetation of mining waste is a common procedure for surface stabilization, grasses and legumes will be grown on a number of the test columns. The survival of this vegetation, the uptake of potentially hazardous materials by the plants, and the quality of leachate moving through the columns will be studied. This information may help to explain results obtained in the field studies, provide fundamental information on chemical and physical reactions, and verify the validity of full scale waste management practices.

Procedure:

Columns of mining solid waste or waste covered with soil material will be constructed in sections of pipe to simulate the conditions of reclaimed and unreclaimed waste disposal sites. Drainage ports at the bottom of the columns will allow for collection of leachate samples. A preliminary chemical analysis of the waste and cover soil for physical (size, pore volume, etc.) and chemical properties (nitrogen, phosphorus, potash, pH, SAR, heavy metals, etc.) will be made. Based on these tests, the nutrients needed to support plant growth will be identified. Fertilizer containing these nutrients and sufficient lime to adjust the soil pH to values normal for the plant growth will be added to the mine waste and will serve as a control column to demonstrate the success of growing plants on supplemented mine waste only. An additional control column will be composed of untreated mine waste with no vegetation.

Columns containing mine waste which has been supplemented and covered with up to four feet of soil material will demonstrate the usefulness of special cover material for improving the growth of vegetation, reducing leachate volume, improving leachate quality, and preventing the upward movement of acid and salts. Subsequently, columns containing layers of absorbing or non-absorbing materials such as charcoal, gravel, etc., will also be investigated for prevention of metal salt and acid movement through the soil.

On a regular basis, leachate samples will be collected and analyzed for critical parameters. Records of added water and leachate volumes will be kept.

Periodically, samples of vegetation will be taken from each of the columns. These will be analyzed to indicate the uptake of metal ions by the

plants. At the conclusion of the study, analysis of the cover material and waste at various depths will be made to determine chemical and physical changes. Of special interest will be accumulation of salts and potentially hazardous chemicals.

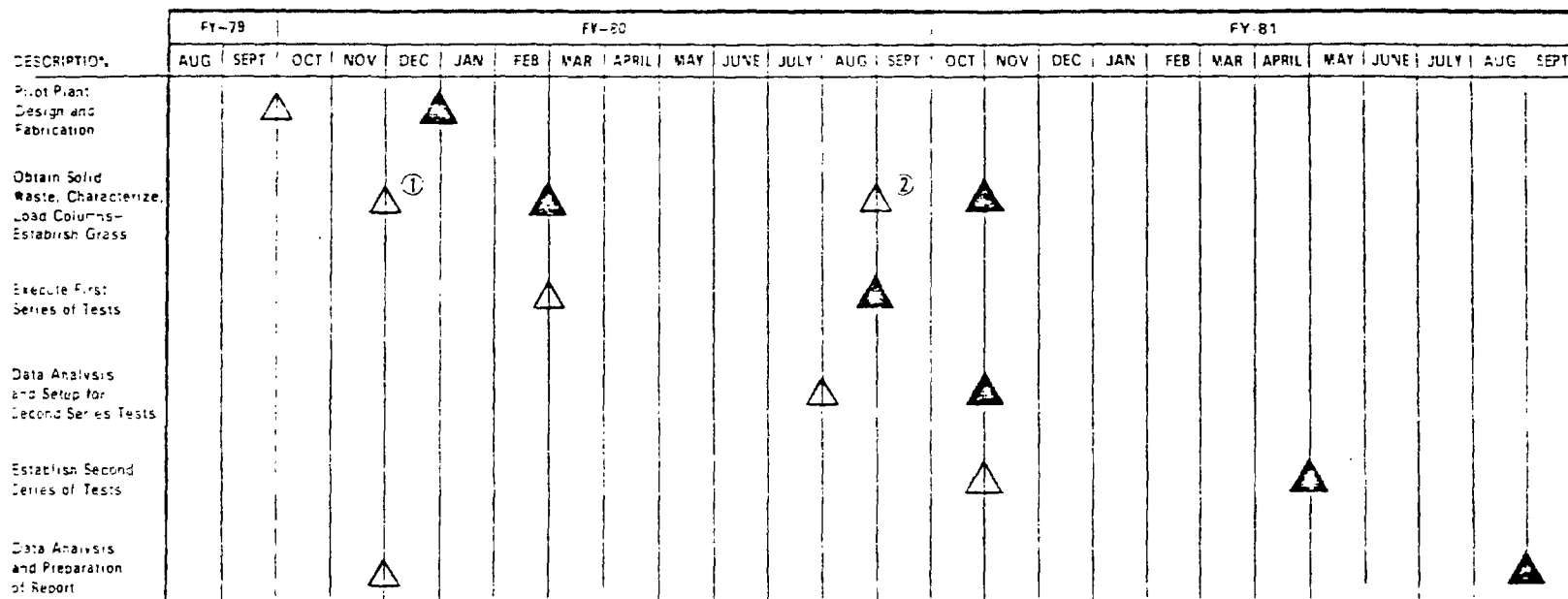


Figure 19: Project Schedule for Leachability and Revegetation of Solid Waste from Mining

- △ Start Task
- ▲ Complete Task
- ① Series 1
- ② Series 2

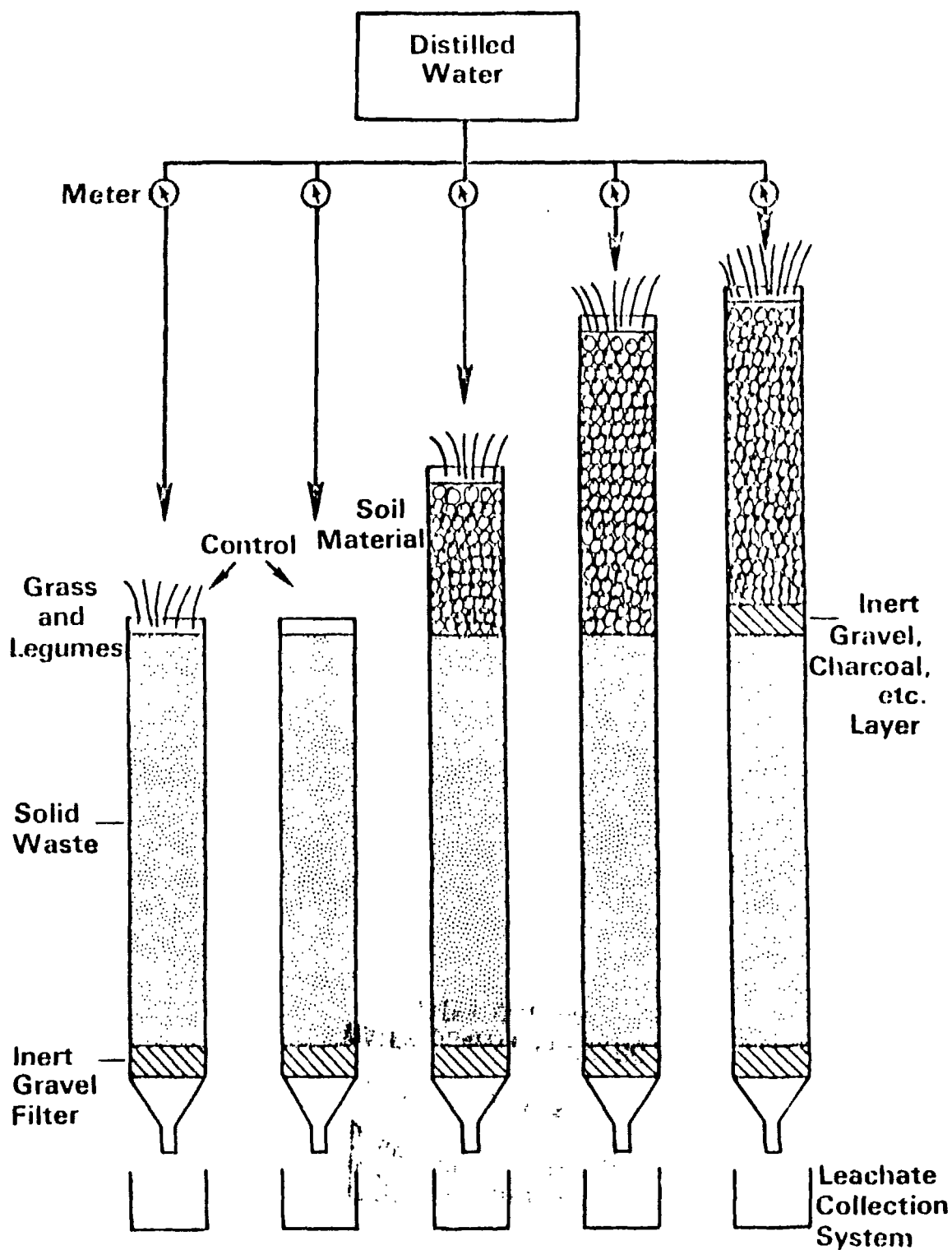


Figure 20. Example set-up for Leachability and Revegetation of Solid Waste from Mining